From individual innovation to global impact: the Global Cooperation on Assistive Technology (GATE) innovation snapshot as a method for sharing and scaling

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ORIGINAL RESEARCH

From individual innovation to global impact: the Global Cooperation on Assistive Technology (GATE) innovation snapshot as a method for sharing and scaling

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ABSTRACT

Assistive technology (AT) is an essential facilitator of independence and participation, both for people living with the effects of disability and/or non-communicable disease, as well as people aging with resultant functional decline. The World Health Organization (WHO) recognizes the substantial gap between the need for and provision of AT and is leading change through the Global Cooperation on Assistive Technology (GATE) initiative. Showcasing innovations gathered from 92 global researchers, innovators, users and educators of AT through the WHO GREAT Summit, this article provides an analysis of ideas and actions on a range of dimensions in order to provide a global overview of AT innovation. The accessible method used to capture and showcase this data is presented and critiqued, concluding that "innovation snapshots" are a rapid and concise strategy to capture and showcase AT innovation and to foster global collaboration.

➤ IMPLICATIONS FOR REHABILITATION

- Focal tools such as ePosters with uniform data requirements enable the rapid sharing of information.
- A diversity of innovative practices are occurring globally in the areas of AT Products, Policy, Provision, People and Personnel.
- The method offered for Innovation Snapshots had substantial uptake and is a feasible means to capture data across a range of stakeholders.
- Meeting accessibility criteria is an emerging competency in the AT community.
- Substantial areas of common interest exist across regions and globally in the AT community, demonstrating the effectiveness of information sharing platforms such as GATE and supporting the idea of regional forums and networks.

Introduction

Assistive Technology (AT) is globally recognized as a cost effective and sustainable intervention required by people with disabilities and people ageing into disability [1]. AT plays a key role in population health as a strategy to deliver on the UN Sustainable Development Goals [2,3]. Access to available and affordable AT for all people has been enshrined as a human right within the United Nations (UN) Convention on the Rights of Persons with Disabilities [4], but significant unmet and under met need for AT exists [5]. The World Report on Disability estimates only 1 in 10 people have access to AT: a shortfall for more than 1 billion people [6].

"Assistive technology" is a generic term referring to both products and services. An assistive product is "any product (including devices, equipment, instruments, and software), either specially designed and produced or generally available, whose primary purpose is to maintain or improve an individual's functioning and independence and thereby promote their wellbeing" [7, p0.2229]. AT products are defined through 650 subclasses and 12 classes of the international standard for classification and terminology of assistive products ISO 9999 [8]. AT services are the human factors which support the evaluation and provision of AT products [9,10]. AT systems refer to "the development and application of organized knowledge, skills, procedures, and policies relevant to the provision, use, and assessment of assistive products" [7, p0.2229]. This therefore includes training in the use of AT and other infrastructure and technologies, such as ICT, that promote the effectiveness of AT. When AT products and services are tailored to an individual and their environment in an appropriate service delivery context [11], a wide range of outcomes are possible. These include protecting, supporting, training or substituting for body functions, structures and activities; preventing impairments, and enabling participation [12,13].

The World Health Organization (WHO) identifies increasing access to high-quality and affordable medical products, including assistive technologies, as one of its six global leadership priorities. In response, GATE was established by WHO in 2014, and aims to improve access to high-quality affordable assistive products [7]. The GATE initiative has prioritized research and innovation as a key focus area, identifying five strategic research priorities:

i.   effects, costs and economic impact of AT;
ii. AT policies, systems, service provision models and best practices;
iii. high quality and affordable AT;
iv. human resources for the AT sector; and
v.   standards and methodologies for the assessment of assistive technologies and unmet need [14].

Table 1. Snapshot yield.

Sample	Invitation to submit an Innovation Snapshot		$n = 192$
Phase 1	Invite 60 word abstract with indication of area of global research priority	Phase 1 and 2 combined: 15/6–21/7	$n = 78$
Phase 2	Accepted abstracts provided PowerPoint template and instructions		$n = 27$
Phase 3	Accessibility and quality review of Snapshot		
	Required accessibility advice and one resubmission		$n = 42$
	Required second review		$n = 10$
	Required third review and assistance to create Snapshot and ensure accessibility		$n = 3$
Final yield			92[a]

Six delegates proposed multiple Snapshot abstracts. Three of these were advised to combine innovations or to focus on only one aspect; three other participants were invited to submit two Snapshots based on the merit of the abstracts.

[a]The Snapshots included six from participants unable to travel to the summit, plus one accepted Snapshot which was subsequently withdrawn due to a potential conflict of interest.

To progress the global priority research agenda, the Global Research, Innovation, and Education in Assistive Technology (GREAT) Summit, as a GATE initiative, was held 3–4 August 2017 at WHO headquarters in Geneva. Two hundred AT stakeholders including expert users, global researchers, innovators and educators were invited from over 70 countries to discuss service delivery, research education and training related to AT policy, products, personnel, provision and usage[1]. The transformative agenda of the GREAT Summit aimed to connect a broad cross section of individuals and settings in order to leverage global change and development. This article reports on the design, uptake and coverage of "Innovation Snapshots" as a Summit outcome.

Method

The "Innovation Snapshot" tool

A method was sought which would enable participants to contribute an aspect of their work or a perspective which could be readily shared, yet not occupy time on the Summit Programme. Unlike academic conference papers or in-conference poster presentations, the focus was on showcasing innovations in a practical way to enable uptake by global colleagues. Seeking a format which was viewable at a glance, an electronic poster format was adapted for use and comprised a single, accessible PowerPoint slide template in portrait view. Contents of the "Innovation Snapshot" included:

i. Title
ii. Sixty word abstract
iii. Your research, education or innovation snapshot
iv. What is the impact for AT users and other stakeholders?
v. Implications for Products, Provision, Personnel or Policy
vi. Implications for other aspects of the Global Research Agenda
vii. Strategies to share and build global capacity based on this work
viii. Contact details for global liaison

Accessibility of the Innovation Snapshots was a fundamental criterion, enacting the rights of people with diverse access requirements to be able to both author and read any Summit proceedings. Current accessibility standards were reviewed and a subset of relevant guidelines were provided which would ensure ease of access to users of switching software and hardware (for physical access) or screen readers/magnifiers (for visual access) [15]. Access features included:

- adherence to reading order for screen readers;
- minimum font size and color contrast for visual accessibility; and
- alternative text to support images.

Adherence to minimum accessibility features (i.e., to meet the PowerPoint accessibility checker standards for navigation and presence of alternative text for diagrams or pictures) was required as a minimum for acceptance of the Snapshot into the proceedings. A peer review process was used to evaluate the submitted Snapshots to ensure fidelity with the Summit aims and intent.

Sampling

The GREAT Summit represented a purposeful sample of prominent AT users, researchers, innovators, educator and practitioners in the field of AT. Expressions of interest in attendance were issued through the GATE community, and wide dissemination of the Summit intent through international AT networks. Over 400 potential participants were either self-nominated or were nominated by others, with the final selections made by the GREAT Summit nominations committee.

A three-phase process was used to recruit and review Snapshots as outlined in Table 1. This was streamlined into a two-phase process as timelines grew shorter. Participants who confirmed their intention to attend between June and mid-July were invited to submit a 60-word abstract, and also to indicate which of the six global research priorities were addressed by the topic. These abstracts were peer reviewed by the first author and triangulated with the second author if required. Criteria included (i) relevance to at least two of the Global Research Priorities and (ii) a tangible commitment to global collaboration. The accessible Snapshot template was then provided and participants were invited to complete their Innovation Snapshots. On receiving the Snapshots, these were reviewed by the author team and its accessibility was checked and, where necessary, guidance was provided to improve accessibility. One month prior to the Summit, as participant registrations continued, a combined procedure was implemented whereby participants were invited to provide an abstract and a proposed Snapshot on the accessible template simultaneously in order to expedite the production process. Snapshots needed to be formatted for display electronically at the Summit therefore a final deadline of 21 July was established and communicated. The last Snapshot was accepted on 24 July, 3 days post-final deadline. As registrations continued until the day of the Summit, late participants did not have time to take up the opportunity to author a Snapshot.

Data analysis

Analysis of snapshots

The results of the Snapshots are reported statistically, and in relation to the Global Research Themes of GATE. Content analysis was used to map the Snapshot content to relevant frameworks, specifically the sustainable development goals (SDGs) [2] and the WHO International Classification of Functioning (ICF) [12]. The second author conducted the content analysis by systematically evaluating

the topics, textual content and graphics of each Snapshot. The first and second authors reviewed and confirmed this analysis.

Analysis of the snapshot method

An online survey evaluating the GREAT Summit after the event also provided data regarding the Snapshots. Thematic analysis by the first and second authors generated qualitative findings regarding the experience of the Snapshot production, and their outcomes.

Results

Demographic and content analysis of the Snapshots are presented, followed by data from the GREAT Participant Survey regarding the uptake, experience of and outcomes expected from Innovation Snapshots.

One hundred and ninety-two (192) GREAT Summit participants were invited to submit a Snapshot. Ninety-two Snapshots were accepted from 48% of Summit participants. Table 1 outlines the invitation and review process as well as the data related to each phase. Ninety-two Snapshots were accepted post-review, were formatted and displayed during the GREAT Summit, and form part of the eProceedings[2].

Demographic analysis

Over 70 countries were represented at the Summit. Table 2 captures the spread of Snapshot authorship. Almost 30% of Snapshots originated from Europe, followed by just over 21% from the Americas, 13% from African regions and from the Western Pacific, nearly 9% from South East Asia, and just over 5% from Eastern Mediterranean region. Only 8% of Snapshots had an authorship team spanning two or three Global Regions, illustrating a promising start to global collaboration.

Regional data was also analyzed for any data trends. The broad themes of provision, health workforce, and accessibility of information were identified as the focus of different regional areas (Figure 1). A strong focus on innovation related to the health workforce was found in South East Asian and Western Pacific Regions, specifically concerning adapted models of provision, and creating a more user-centred environment in the field of AT. Accessibility of information was a focus of Snapshots from the European regions and Eastern Mediterranean regions, while Africa and the Americas focused on AT provision. Evaluation and needs assessment, and standardization of products and services were strong themes evenly spread across regional areas.

Content analysis

Content analysis utilized three frameworks: the UN Sustainable Development Goals [2], the Global Research Priorities [14], and the International Classification of Functioning, Disability and Health (ICF) [12].

Snapshots were found to strongly correlate with Goal 1 (No Poverty), Goal 3 (Good Health and Well-being), Goal 4 (Quality Education) and Goal 10 (Reduced Inequalities), suggesting that AT innovation is perceived to have a key role in wellbeing-based outcomes (health and education) as well as rights-based outcomes (reduced inequality; poverty reduction).

The relevance of the five Global Research Priorities was initially identified by authors within the abstract, and verified through content analysis. Most (n = 42; 46%) focused on one global research priority; 24 (26%) abstracts covered two global research priorities, 11 (12%) abstracts with three global research priorities, and the

Table 2. Snapshot authorship by region.

World region	No. of countries	Percentage (%)
EURO (European)	27	29.35
AMRO (Americas)	20	21.74
AFRO (Africa)	12	13.04
WPRO (Western Pacific)	12	13.04
SERO (South East Asia)	8	8.70
EMRO (Eastern Mediterranean)	5	5.43
WPRO/SERO/EURO	3	3.26
AMRO/EURO	2	2.17
AFRO/AMRO	1	1.09
AFRO/WPRO	1	1.09
EURO/EMRO	1	1.09
TOTAL	92	100.00

remaining 15 (16%) mapped to the overall global research agenda. Figure 2 demonstrates the distribution across the research priorities. Interestingly the largest areas of focus was not products themselves (20%) but the policies, systems and practice models to support assistive products (33%). Both human resources and research upon the impacts of AT represented 17% of Snapshots, with 13% focusing on standards and methodologies for evaluating AT need.

The WHO ICF offers four Classification dimensions with which to classify human functioning, namely Body Structures, Body Functions, Activities and Participation, and Environmental Factors [12]. Analysis identified the main focus of content for each Snapshot, as well as a secondary focus if this was present in three or more of the five Snapshot sections. For example, while reference was made to diagnoses and body structures and functions as part of problem definition in many Snapshots, none focused on this element under more than two headings therefore Body Structures and Body Functions did not emerge as important dimensions. Primary analysis by the second author classified 87 Snapshots against Environmental Factors as the primary domain. Triangulation by the first author located all 92 Snapshots within Environmental Factors. WHO ICF offers five chapters of Environmental Factors: Products and Technology; Natural environment and human-made changes to environment; Support and Relationships; Attitudes; and Services, Systems and Policies [12]. More than half of the snapshots (62%) addressed Services, Systems and Policies that govern AT, in particular, health services. Approximately one quarter addressed Products and Technology (28%), including for personal use in daily living, for mobility and transportation, and for design of public buildings (Figure 3).

The secondary dimension of importance was Activities and Participation. Thirty-one of the 92 snapshots (34%) described innovations that addressed areas from both Activity and Participation and Environment. Analysis also considered which of the nine Activity and Participation Chapters were addressed in the Snapshots. Mobility (12%; Moving Around Using Equipment), Major Life Areas (10%; Formal Education and Informal Education), and General Tasks and Demands (5%; Undertaking Multiple Tasks) were chapters of focus.

GREAT participant survey results

An online survey of all participants was conducted 1 week after the completion of the GREAT Summit. Of the 200 delegates, 97 responded (a response rate of 48%).

Sixty survey respondents, (62%) had submitted a Snapshot, and 37 (38%) had not. The question set regarding Innovation Snapshots asked about the experience of completing or reading Snapshots, their impact, and access.

Accessibility was rated as highly important both for readers and for authors. Given the profile of accessibility within the AT

Figure 1. Snapshot themes related to global regions.
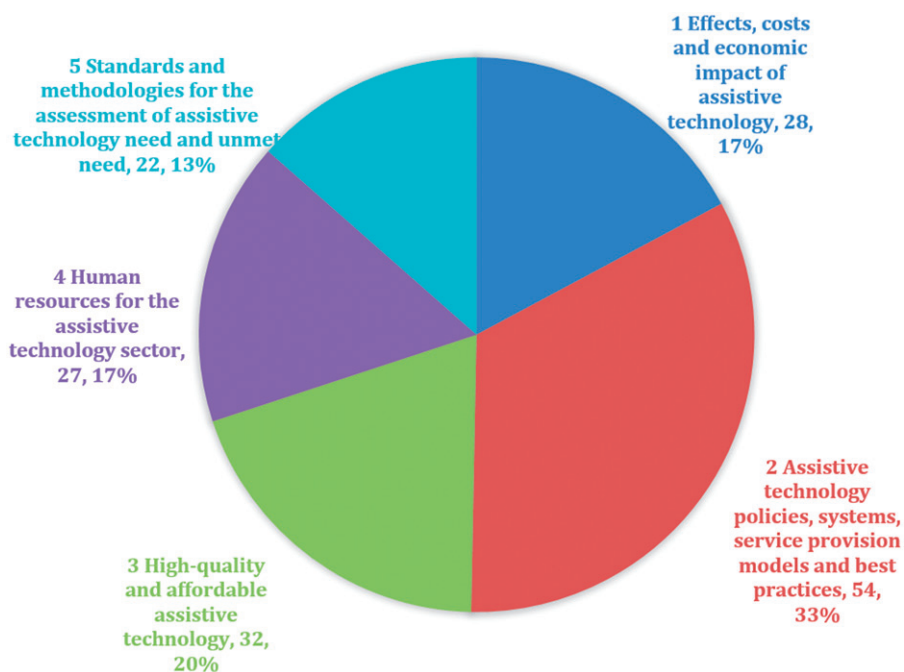

Figure 2. Global research priority themes in Snapshots.

community a surprising number of authors were implementing accessibility principles within this PowerPoint format, for the first time. Participants described the experience of making the snapshots accessible as an "*eye opener*", that "*prioritizing accessibility was refreshing*", and that learnings regarding creating accessible documents would be used in future projects. Forty-two Snapshots (46%) were returned by reviewers for access edits with step by step instructions, and thirteen (14%) required multiple instances of support and guidance to achieve accessibility standards. When asked to rank the ease of the experience of creating an accessible snapshot (1 = difficult and 5 = easy), the weighted average was 4.17/5, indicating that while some participants did have difficulties, overall it was found to be manageable. Barriers included difficulty adapting the content to the template provided, use of out-dated software which did not support accessibility features, and use of graphically designed marketing materials which were not accessible to screen readers or switching software. Overall, participant commentary concluded access was "difficult to get right" but important, concluding "thanks for raising the profile of access".
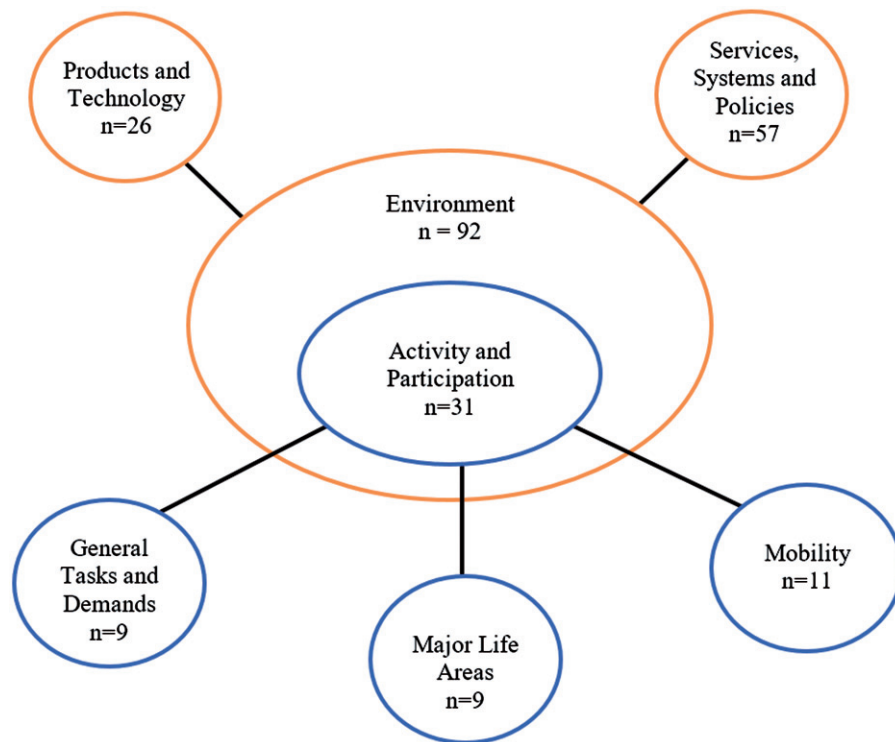
Figure 3. Analysis of Snapshots against WHO ICF chapters.

As a tool for information sharing, the Innovation Snapshot was identified as a useful way to share and to receive information, with a weighted average of 4.1/5 (scale is 1 = not useful, and 5 = useful). One participant commented "these seemed like a side idea [but] I believe it was a core source of information". They were "very effective because they contained detailed information on one slide and one did not need to flip through pages of a single presentation. Since the snapshots have been shared, they will give an opportunity to be revisited by scrutinizing them in detail and get the substantive elements in them that are applicable … to our local situation/environment".

Participants described having been made aware of "different topics from different countries" and give a valuable opportunity to reflect on what is being done, and what needs to happen next. In terms of impact, several participants had contacted Snapshot authors to form collaborations, and collated relevant subsets of Snapshots to be shared in their member country. Participants proposed improvements for future deployment of Innovation Snapshots. Suggestions included the desire to have Snapshots displayed for a longer duration of time on the TV screens at the Summit, to have select snapshots presented during the Summit proceedings, and to share copies of the Snapshot prior to the Summit to enable participants to maximize time spent networking during the conference. Multiple participants anticipated that the publication of Snapshots would be helpful for future collaborative initiatives [16].

In terms of representation and collaboration, the method used to create the Innovation Snapshots proved generally effective in encouraging participation from across the globe, with all WHO regions represented in the geographical distribution of snapshot submissions. Both collaborative and individual authorship was evident, and a measure of impact will be any increase in cross-regional collaboratives should a future Summit be run and deploy Innovation Snapshots. One coauthor stated, "I believe this made us realize the importance of the work we are doing on AT and also enhanced our vision towards AT". Participants noted the

Snapshots made it possible to "contact other professionals interested the same subject" and this is the great hope for the ongoing value and utility of the GREAT Summit Snapshots.

Discussion

The Summit provided, among other things, an opportunity to canvass the "state of the globe" in relation to AT, and nearly half of the purposefully selected Summit participants rose to the challenge. The use of Innovation Snapshots as a summative method was effective on a number of levels. High uptake (enabled ideas to be shared without having "airtime" at a busy event such as the GREAT Summit. The invitation to participants to share an innovation or innovative practice of their choosing enabled a wide diversity of topics, yet the adherence to a structure such as the Global Research Priorities ensured that the breadth of AT products and practices were clearly aligned to global goals.

Innovation Snapshot authors were directed to explicitly link their innovations to the Research Agenda and to identify scalable ideas. It is perhaps unsurprising that Snapshot analysis found a focus on solutions rather than problems, and enactment of a social model of disability through a focus on environments which enable activity and participation rather than diagnostic and individual remediation scenarios. While socio-cultural and resource settings were vastly different, innovation was evident everywhere. The problem focus clearly differs across regions, with AT provision, accessibility of information, and health workforce representing three clear aspects of concern for key world regions. Innovation Snapshots as a strategy have illustrated a range of innovative solutions being implemented to bridge these gap in access to AT.

It is possible that the Snapshot format and data requirements did not enable more complex topics to be captured or explored. It was also noted that for some participants, expectations to publish in English and the infrastructure for producing an electronic document of this kind, presented capacity barriers. Despite this, a

powerful set of Snapshots did reflect grassroots practice and the impressive efforts of many AT champions to "open the GATE" in a diverse of ways. Other than initial abstract review and advice regarding topic scoping, the work of the authors focused on supporting accessibility compliance. An area of future focus and development could include mentoring and support of participants at future GREAT Summits, to showcase "unheard" innovations should participants wish to do so.

The concept of a global audience seeded some unexpected collaborations: for example, common issues across Africa and Australia, or congruent mobility initiatives across three continents. The challenge now is to connect, leverage and scale these ideas. Unless AT stakeholders publish their work rapidly and in accessible platforms and formats, it is likely that international colleagues, even national colleagues, may not be aware of potential synergies. Global colleagues can now quickly and comprehensively identify current work and opportunities on developing the capacity of the health workforce, strengthening the policies and systems that guide AT provision, developing high quality products and services, increasing standardization, and innovative methods for evaluation and needs assessment. This critical work, completed by AT innovators, researchers and educators, plays a fundamental role in addressing the UN call to increase global access by strengthening the *systems* that surround AT.

The GREAT Summit Innovation Snapshots aimed to enable collaboration, to support collegial learning, and to foster the impact and scalability of great ideas. The Innovation Snapshot content has furthered the research agenda for AT. The Innovation Snapshot method provided a consistent process which was able to deliver focused and useable outputs. The accessibility requirements created a demand for heightened competence in creating accessible work, and "walked the talk" of inclusive research practice. And finally, the AT community came together to conceptualize, deliver, read, connect over the Snapshots delivered. The inaugural yield of 92 Snapshots, now freely available from http://www.who.int/phi/implementation/assistive_technology/great_summit/e-proceedings/en/, capture exciting and diverse innovations that will impact the user and their families, health workers, and broader society.

Conclusion

AT is a broad field, encompassing a wide diversity of product types, service supports, educational requirements and provision settings. Research or evidence translation methods which can encompass this breadth are rare. The use of Innovation Snapshots created a method that enables a wide range of stakeholders to articulate the individualized detail of what it is they do. Furthermore, the Innovation Snapshot methodology provided a platform to raise the bar on standards for electronic accessibility, and to facilitate professional growth in this area. Innovation Snapshots create the opportunity for global collaborative partnerships with the potential for creating large-scale change. The Innovation Snapshot method proved to be a useful way to understand the diversity, the similarities and the potentials of innovations in the field of AT. It is hoped that the Innovation Snapshot approach will foster synergistic efforts to address the AT-related needs of more than one billion people globally.

Notes

1. http://www.who.int/phi/implementation/assistive_technology/great_summit/en/
2. http://www.who.int/phi/implementation/assistive_technology/great_summit/e-proceedings/en/

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